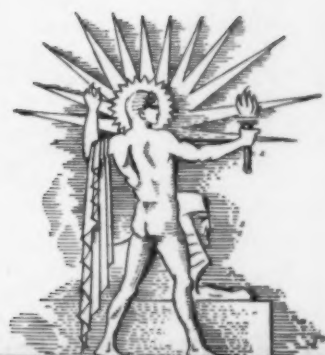
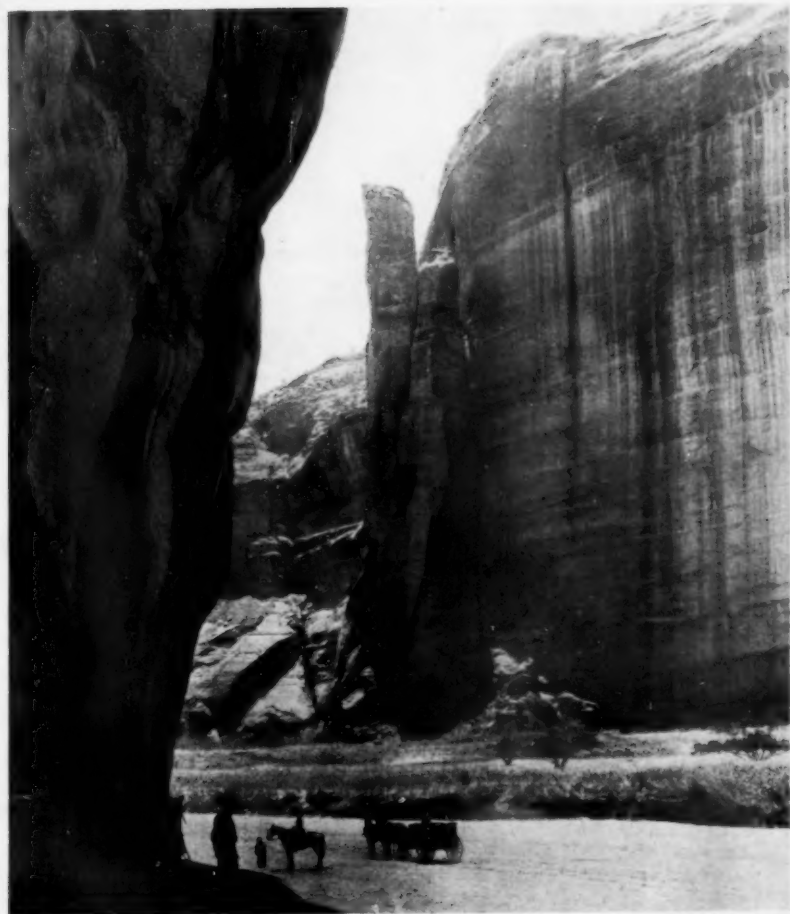


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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



MARCH 7, 1931

Famous Canyon Now National Monument

See Page 152

A

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Summary ofCurrent
Science

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DO YOU KNOW THAT

Africa's two great rivers, the Nile and the Congo, are now linked by a motor road, used by a regular motor mail service.

Taking the measure of a raindrop, by letting drops fall into plaster of Paris, shows that the largest drops are about a quarter of an inch across.

The mongoose, introduced into the Hawaiian Islands to exterminate the rat, has itself become a serious pest, while doing very little to lessen the number of rats.

"Smog" is the weather man's name for the combination of smoke and fog which sometimes besieges cities in cold weather.

An international committee is arranging for the compilation of a map of the Roman Empire; the first sheet, showing part of Great Britain, has already appeared.

A Roman lady's cosmetic box, still containing grease paint and materials for mixing cosmetics, has been found near Frankfurt, Germany.

Falconry, the art of hunting with trained birds, was known in China about 2000 B. C.

Because the early Egyptian calendar allowed exactly 365 days to a year, a festival observed on a fixed date would occur a day earlier every four years, until in the course of 1,460 years it had been observed at every season and was back at the starting point.

Lightning rods are being placed more frequently on trees, to protect valuable trees and also to protect horses that take shelter under trees in sudden storms.

An international agreement on uniform storm signals is sought, to replace some 40 different systems now in use.

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Science Service presents over the radio, an address

NATURAL HISTORY OF THE NATIONAL PARKS

By Horace M. Albright, director of the U. S. National Park Service

Friday, March 13, at 3:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

PSYCHIATRY

Can Predict Mental Disease From Study of Children

Prediction Makes Possible Early Treatment Which Would Prevent, or at Least Postpone, Mental Breakdown

THE DEVELOPMENT of mental disease can be predicted in advance by psychiatric studies of children, Dr. J. Kasanin and Louise Veo of Boston reported to the annual meeting of the American Orthopsychiatric Association in New York.

"We studied eight children who were examined at the Judge Baker Foundation of Boston because of mild conduct disorders, or were sent there for advice about placement and vocation, and who later on in life became psychotic," the investigators reported.

"In most of the cases the development of a personality disorder was foreseen long before the appearance of social criteria of mental disease. We studied the personality of the children as they were observed by the various informants long before there was a suspicion of mental disease."

Dr. Kasanin pointed out the interesting fact that in the small series of cases studied, the various mental diseases were the developments of special personality types.

Prevention of the development of a mental disease or breakdown should logically follow the prediction of it. In most of the cases in the study, the directions for treatment were not followed. Dr. Kasanin and his colleague suggested that greater effort in treatment made both by social agencies and by the individual might have prevented or at least postponed some of the breakdowns in this series.

The Rorschach test, which has been hailed as one of the most promising ways of predicting behavior, was described by Dr. Samuel J. Beck of the Boston Psychopathic Hospital.

The test consists of a set of ten ink blot designs, some black and some colored, designed by a Swiss psychiatrist, Dr. Herman Rorschach. The child being tested looks at the ink blots and tells what he sees in them, butterfly wings or volcanoes or polar bears or whatever they may appear like to him.

From the child's responses the psy-

chiatrist can tell his general intelligence level, personality traits and even what his behavior will be in certain situations.

Dr. Beck has been working with the tests and gave his results with them on a group of problem children. He was able to check these results against the clinical findings in the various cases. In only three out of 37 children tested, the Rorschach results were not substantiated by the clinical findings, so that these three had to be considered faulty diagnoses.

From these tests Dr. Beck concluded that a great majority of a group of problem children are likely to be suffering from anxiety attitudes which are damaging a portion, if not all, of their psychic apparatus.

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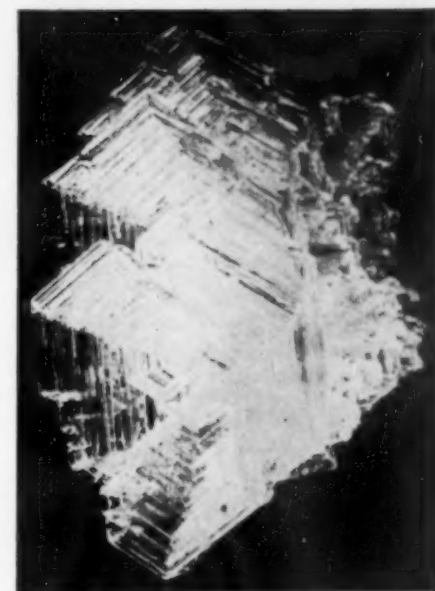
PHYSICS

Hollow Ice Crystals Formed In Famous Kungur Caves

LARGE ice crystals, up to eighteen inches across, can be found at only one spot in the world, at the famous Kungur ice-caves of the Ural mountains, is the claim made by Dr. W. Altberg and W. Troschin in a recent number of the scientific magazine, *Naturwissenschaften*.

Creeping its way along the chill subterranean passages, the expedition of the Hydrological Institute of Leningrad, led by these scientists gasped at the fantastic structures taken by water in these remote grottos. They returned with a priceless set of photographs to share their amazement with the scientific world.

Snowflakes, seen under the microscope as beautiful, delicate six-pointed crystals of very varied designs, will not bear comparison with these strange Russian formations. Hailstones on very



ENORMOUS ICE FLOWERS

These ice crystals of giant dimensions and fairy-like delicacy were formed as the result of very unusual underground conditions in the caves of the Ural mountains. They owe their beauty to their hollow formation. Some have been found as large as 18 inches in diameter. While nature turns out such huge ice crystals, scientists working in their laboratories have not been able to make one large enough to be seen with the naked eye.

rare occasions have been found to consist of larger crystals, visible without magnification.

The cave crystals are not compact and solid. They are hollow, and six-angled, with a curious, spiral geometry. They show the intricate tropical forest effects of window-pane frost projected into three dimensions.

The odds against the coincidence of unusual physical circumstances necessary for the growth of large crystals to visible size must be enormous, the Soviet scientists say. Only at one other place on the earth's surface have they been reported and there not permanently.

The ice is deposited like hoarfrost by the cooling of moist air as it passes outwards through the caves. Those of the weird caves, so far explored, 22 in number, stretch in a nearly straight line for a distance of a kilometer. Measure-

ments by the Hydrological group showed that with a temperature outside of 40 degrees below zero the entrance to the first grotto, which contains much ice, was at 3 degrees Fahrenheit. The temperature rose steadily as the awed party passed inward through the successive

caverns, reaching as high as 45 degrees Fahrenheit above zero in the innermost cave.

The information obtained by the Leningrad party throws new light on the mode of formation of ice crystals and on the origin of ice caves.

Science News Letter, March 7, 1931

MEDICINE

Improved X-Ray Methods Developed at Mayo Clinic

New Technique Makes Possible Use of X-Ray In Fighting Gall Bladder Troubles and Intestinal Ills

DR. B. R. Kirklin and Dr. H. M. Weber, of the Mayo Clinic, Rochester, Minn., have announced results of new work in the X-ray detection of disease. Dr. Kirklin's work has been on the gall bladder and Dr. Weber's on the large intestine.

The X-ray picture, as is well known, is a shadow, cast in varying density, according to whether the rays can or cannot pass through the tissues. The stomach, intestines, normal gall bladder, and their normal contents allow the rays to pass easily, and therefore do not cast good shadows on the X-ray film. Shadows of gallstones which would stop the passage of X-rays have been seen on films for many years. However, not all gallstones are satisfactorily opaque to X-rays.

The story of the development of methods for getting X-ray pictures of the gall bladder is a long record of brilliant achievement. Briefly, the method is as follows: The patient is given a harmless dye through which X-rays will not pass, and which is gathered up in the gall bladder; then pictures are taken at intervals for a number of hours.

Using this method, until recently it has been considered impossible to distinguish between the shadows of gallstones of low calcium content and papillomas, which are little wart-like growths. However, Dr. Kirklin found a number of features that were characteristic of papillomas and not of gallstones. For instance the shadows of the papillomas were in the same position on all the films, whereas the shadows of gallstones might be in different places on different films; moreover, the shadows of papillomas were not immediately at

the bottom of the gall bladder, whereas the stones would be likely to be there, like marbles in the bottom of a bag. There were, also, other characteristics. Four patients on whom Dr. Kirklin made the diagnoses were operated on, and papillomas were found, as he had predicted, in all four.

The method used by Dr. Weber in taking X-ray pictures of the large intestine was developed by Dr. A. W. Fischer, in Germany, and has been used

also by Dr. J. Gershon-Cohen in this country in the X-ray diagnosis of tuberculosis of the large intestine.

It has been customary, in taking X-ray pictures of the large intestine, to give the patient an enema, in which is suspended some barium, a substance through which X-rays will not pass. Thus, a shadow of the barium-filled intestine is obtained and deformities caused by disease can be seen. The method is good. However, it fails to disclose soft masses that do not cause deformity of the wall of the intestine, but merely project into its cavity.

The new method discloses such masses, including growths called polyps, in which Dr. Weber was particularly interested. The patient takes the enema, as in the old method, but expels it. Then, before the picture is taken, what might be called an air enema is given very carefully. The result is that the polyps, to the surface of which the barium has adhered, are outlined.

To detect the presence of these polyps is important, since they have a tendency to develop into cancer. Also, Dr. Kirklin expects that his discovery that papillomas of the gall bladder can be detected, will be extended to the detection of early gall bladder cancers.

Science News Letter, March 7, 1931

PHYSICS—PSYCHOLOGY

Non-Living Matter May Learn and Remember

THE ABILITY to learn and remember is probably not confined to living organisms.

An important mathematical investigation by Dr. N. Rashevsky of the Research Laboratories of Westinghouse Electric and Manufacturing Company has shown that certain mixtures of lifeless fluid substances ought to show behavior indistinguishable from what we call memory. Properly chosen combinations of liquids will respond to repeated changes in the temperature, pressure or other conditions to which they are subjected, as if they were sensitive to their past experience and could put 2 and 2 together.

Apparently this unique behavior is possible in a system which may come to rest in more than one position. For instance, a rectangular block may be in equilibrium when resting on any one

of its faces. In addition, however, there must be a lag in the changes within the mixture itself, by which when the substance is displaced from its resting condition an appreciable time is required for recovery.

Dr. Rashevsky has actually proved that such mixtures would show Pavlov's famous conditioned reflex which is the foundation of behavioristic psychology.

It is not suggested that this is the exact physical mechanism of memory in living animals. Further, no such mixture has yet been made and tested in the laboratory, though the mathematics makes that sequel probable.

However, this is one of the most daring and well-informed attempts to handle a question of psychology and biology by the method of mathematical physics.

Science News Letter, March 7, 1931

CHEMISTRY

Uncle Sam's Laundry That Has No Customers

Scientists' Findings About Shrinkage and Fading Of Clothes Will Aid Both Housewives and Laundrymen

SUPER-LAUNDRY equipment has been installed by the U. S. Department of Commerce at the Bureau of Standards in Washington. Though fitted with the most up-to-date laundry devices, this singular plant has no customers and clothing belonging to nobody is duly put through its suds.

The object of the Government's unusual laundry is to do right by the clothes of the nation. It stands between the much abused laundryman and the irate housekeeper, listening to the troubles of both and giving advice that will result in better satisfied customers for the laundry and longer-lived, cleaner clothes for the housewife.

Sometimes Uncle Sam's laundry specialists actually try to shrink a pair of stockings to as near nothing as they will shrink or rub as much of the color out of a cloth as will come out in an extra strenuous wash. For the aim and object of so much elaborate equipment is not to launder successfully any one particular item, be it sock, pants, dress, towel, or shirt, but to discover how and why clothes sometimes return from the laundry rejuvenated and then again come back looking as if they had been to the wars.

Thus if a gorgeous cloth of turquoise blue emerges from the water a pale, ænemic, sickly shadow of its former self, the Government is likely to witness a grave consultation of chemists. Just why did the blue fade? Was the fault in the dye itself or in the finishing of the fabric? Was the soap innocent or guilty of the laundry mishap? Could the accident have been avoided? And if so, how so? For the sleuthing chemist this would be a mere start on the hunt for facts. Small wonder that one of the first jobs undertaken by the new laundry was to devise a machine that would aid in scientifically answering questions and solving riddles concerned with washing.

A laundrymeter was the result. This is a machine that provides for simultaneously washing twenty different samples under identically similar laundry

conditions to observe the behavior of the fabric and color. By varying the kind of water, the soap, the temperature and the duration of the process, the merits of different laundry methods applied to a wide variety of materials and clothing are likewise tested.

Laundry Questions Answered

Many important laundry questions have already been answered at the test laundry. Women shopping for wash clothes are informed that the shade of a dress, whether it is yellow or blue or pea green, furnishes no clue to its fade-proof qualities. Experiments showed that the chemical type of the dye and the skill with which it was applied to the fabric, not the color, are the important factors in determining color fastness. This discovery by Uncle Sam's laundry specialists contradicts the conviction prevalent among housewives that yellow garments fade more quickly than others.

Many gay-colored dyes appeared practically fadeproof against ordinary laundry conditions but were affected by the brightness of the sun. This was revealed by dresses which survived the suds only to wilt in the sun. This observation blasts another pet theory of the general public, namely that a dye strong enough to withstand washing is likely to be able to withstand light. Actually, the opposite is more nearly the case, as only rare dyes are proof against both light and water, while most of those which are immune to sun, succumb to water, and vice versa.

The immediate value of this test is that it places the blame for a given laundry failure where it should belong. If a fabric proves too unstable to withstand a fair proportion of the test washings, the manufacturer is judged at fault. If, on the other hand, an unduly large proportion of the sample fabrics are damaged in one particular washing test, the process is blamed.

Following the lead of Uncle Sam's test laundry, some of the large department stores of the country have installed laun-

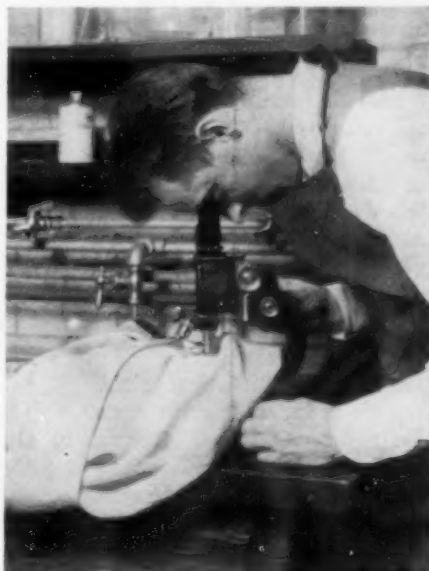
drymeters and are submitting all their piece goods to the test of average laundry conditions of their community before putting them on the counter. This enables the store to guarantee that it has done its part toward making the family wash a success and is leaving it up to the laundryman to do his bit.

For his part, the laundryman can take advantage of the tests to advise his patrons whether their clothes are wash-worthy and to warn them against dyes and weaves that will not survive the ordinary rigors of wash day.

While the tests are designed to protect the dependable manufacturer and laundryman against unfair blame, the individual housewife who buys the clothes and sends them to the laundry is expected ultimately to benefit as the new standards for textile manufacture and laundry methods are forced upon the backward business man by competition.

Soaps and the part they play in the success or failure of wash day constitute another problem now being attacked in a series of experiments at Uncle Sam's laundry. What soaps wash cleanest? What kinds are best for preserving the colors of the goods and what cause the least shrinkage?

The laundry specialists do not expect to discover one universally faultless soap among the thousand and one varieties now on the market. Laundry conditions and requirements vary too radically with time and place and clothing to be laundered for any such all round best soap to be chosen. (Turn to next page)



LOOKING FOR DAMAGE

Scientist determining the damage done by test washings and cleanings.

Our grandmothers found old-fashioned yellow soaps best for their purposes but more and more the modern housekeeper leans toward white laundry soap for her ordinary washing uses. This is explained by the disappearance of the old-fashioned rain barrel and cistern and the growing use of hard water from the deep well supply of city mains. Hard water requires the addition of more alkaline constituents and the substitution of coconut oil for the rosin found in soft-water soaps.

To make a fair test of the cleaning ability of the different soaps, standards for dirt are likewise being set up in the Government laundry. Most hardworking housekeepers know to their sorrow that the most innocent looking spots of dirt sometimes prove terrifically stubborn. Carbon black, umber, and various oil combinations are being tried out as fairly representative and stubborn specimens of dirt.

After it has been discovered what soaps are best for a given cleaning job, the question still remains for the laundry chemist: What makes the soap clean well and what should a good soap contain?

By strict definition, all metallic salts of fatty acids are soaps but, as a matter of fact, only the fatty-acid salts of alkali metals are soluble in water and hence practical for ordinary cleaning. To a less extent rosin acids are used.

Soap is practically never used in its pure state, as various "builders" are added to adapt it to special uses. Sodium carbonate, borate, silicate, and

phosphate are added to make the soap harder and more effective in hard water. Clay, sand, volcanic ash, infusorial earth, pumice and starch in soap serve to scrape and wear the dirt away like good-mannered sandpaper.

To the point which these "builders" serve the purpose for which they are added, they enhance the value of the soap. Sometimes, however, the soap manufacturer is tempted to use an excess of the "builder" to increase the bulk of his product without increasing the cost. And it often happens as the unreliable manufacturer hopes, that the housewife is deceived into believing that she has found a bargain when she gets a large piece of soap for her money, though she is in reality paying dear for clay and starch.

Protecting wholesale soap buyers against such deceptions, the Government has formulated a set of standards for various kinds of soap, including white floating soap, liquid soap, soap powder, grit cake soap, automatic soap, chip soap, ordinary laundry soap, scouring compounds and hand grit soap. This enables the buyer to ask for soap conforming to certain minimum specifications and adapted to his needs and provides a test whereby he can readily determine whether he is being supplied in accordance with contract.

The cleaning ability of a soap is only one of its qualities measured in the tests. The shrinking effect of a given soap and its effect on dyestuffs are other factors that go into the ultimate rating.

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CHEMISTRY

Radium Rays Three Times More Effective than X-Rays

THOUGH radium rays and X-rays cause reddening of the skin to nearly the same extent, the radium is about three times more effective in producing certain other biological effects.

This is the conclusion announced to the Optical Society of America by Dr. G. Failla and P. S. Henshaw of the New York Memorial Hospital.

The work has required the development of an apparatus which would measure equivalent, comparable doses of the two radiations. It was found that 500 roentgen units of radium gamma rays produced the same reddening

of the patient's skin as 600 roentgens of filtered X-rays.

Other experiments were made on wheat seedlings. In both cases the effect of the radiation is shown as a stunting of the shoots and roots. Three times as much X-radiation was required in this case to produce equal effects. Hence it may be desirable to use higher voltages with X-rays for medical purposes.

Dr. Failla emphasized the fact that the suitability of a certain type of rays for a given tumor must always be taken into account.

Science News Letter, March 7, 1931

PALEONTOLOGY

New Dinosaur Species Described in Washington

TWO NEW species of dinosaurs have made their bow to scientific society in Washington, with the publication of their description in the Proceedings of the U. S. National Museum by Dr. Charles W. Gilmore, paleontologist.

The fossil remains of these ancient reptiles were discovered on the Blackfoot Indian reservation in Montana. The bones were brought to Washington for preparation and examination.

One of the dinosaurs, *Paleoscinus rugosidens* by name, was a medium-sized monster with a skull about a foot and a half long. It had a well-developed armor of bony plates on its back in the region of its hips, and was ornamented with numerous formidable spines. The other species, *Styracosaurus ovatus*, resembled the well-known Triceratops, or three-horned dinosaur, though it is not known how many horns it had. Its outstanding characteristic was an array of radiating spines projecting from the edge of the bony frill that protected the animal's neck.

Science News Letter, March 7, 1931

ICHTHYOLOGY

Fish Shoots Insects With Drop of Water

A FISH that shoots its insect prey with a drop of water is among the ichthyological incredibilities definitely assured as scientific facts by Dr. Hugh M. Smith, former United States Fish Commissioner, who recently returned to Washington from Bangkok, where he is adviser in fisheries to the Siamese Government. So accurately can the little fish hurl its liquid projectile that on at least two occasions Dr. Smith has seen lighted cigarettes extinguished in the mouths of smokers on a veranda a couple of yards above the surface of the pond where the fish were swimming.

When the shooting fish sights an insect that it considers a likely candidate for dinner, it quietly pokes its eyes and the tip of its snout above water, holding its body at an angle of about forty-five degrees. It opens its wide mouth just the slightest crack in the middle, like a veteran terbacker-chawer from the Ozarks, and at the same instant suddenly squeezes its gill-covers. The speeding drop of water that shoots forth seldom fails to bring down its mark. Dr.

Smith states that he has even seen these fish dislodge small lizards with these water bullets.

The range of the shooting fish's projectiles has not yet been accurately determined. Dr. Smith says that he has seen the fish make good scores at a distance of a yard, and has known of cases where the projected drops splattered against the ceilings of verandas three or four times that high. He has a number of these fish in a pond in his yard in Bangkok, on which he expects to make further observations. They are sociable fish, he says, and like the attention of human beings.

Science News Letter, March 7, 1931

CHEMISTRY—AGRICULTURE

Public Gets Benefit Of Poison Gas Patent

AN INTERNATIONAL race for a patent on a poisonous gas has been won by the U. S. Department of Agriculture, and the public will get the benefit.

Two scientists of the Department, Dr. Ruric C. Roark and Dr. Richard T. Cotton, discovered that ethylene oxide is an exceedingly effective destroyer of weevils and other insects that infest stored food products. A well-known German dye company patented the gas for use as a fumigant abroad, and applied for a patent in this country. However, the priority of the American scientists' claim was recognized by the U. S. Patent Office, and their patent has been dedicated to public use.

Science News Letter, March 7, 1931

ASTRONOMY

11,000 Miles Per Second Is New Heavenly Speed Record

Astronomers, Not Believing Nebula Really Travels That Fast, See Explanation in Einstein's Curvature of Space

ELEVEN THOUSAND miles per second is the new record "apparent" velocity reported detected in the red-dened light from a distant "island universe" viewed through the world's largest telescope at Mt. Wilson, Calif.

The faint nebula discovered to seemingly recede from earth at this tremendous speed is so far distant that light traveling six trillion miles a year would need 120 million years to reach earth.

This new research result is declared by Dr. John C. Merriam, president of the Carnegie Institution of Washington, to be "of special interest at this time because of Einstein's visit and the bearing that it will have on his conception of the universe." Dr. Walter S. Adams, director of the Carnegie Institution's Mount Wilson Observatory, reported the discovery to Dr. Merriam who announced it.

Milton L. Humason, in photographing with the great hundred-inch telescope the spectrum of the faintest nebula yet observed, discovered by a fellow astronomer, William H. Christie, learned that its spectrum lines were shifted to the red in such a way that a rushing away at eleven thousand miles a second would be necessary to produce it. This

is sixty per cent. greater than any so-called apparent velocity so far observed.

But astronomers do not actually believe that the far-distant cluster of stars is receding into space at any such tremendous velocity. They see the true explanation in the curvature of space, as postulated by Prof. Albert Einstein, now at Pasadena working with the astronomers who made the discovery. Space, he says, is curved in dimensions higher than the three familiar in everyday experience, just as a ball is curved in three dimensions. Very distant objects like the nebula just discovered give effects of great speed not because they are moving rapidly but because they are so distant that space gets a chance to produce its effects.

Science News Letter, March 7, 1931

EVOLUTION

Evolution Depends on "Health Level"

THE evolution of a species is determined in considerable measure by what might be termed its general health level. The rate at which it develops new features, like the rate at which the individual grows, is largely a measure of the rate of its metabolism.

This is the theory developed in an article in *Science* by Dr. Carroll Lane Fenton of the University of Buffalo. Dr. Fenton was led to his conclusions by studies on a large series of fossil sea-shells, called brachiopods. These, by the simplicity or elaborateness of their markings, indicated at once the evolutionary status and the degree of vigor possessed by the animals that formed them.

In any series of shells, Dr. Fenton found, the animals started out with very simple and austere ideas of exterior decoration. As the millenia rolled by, the markings became more elaborate, reaching a climax indicating full vigor. Then a decline would set in, marked by the development of bizarre decoration schemes (Turn to page 156)



YOUTH, MATURITY, OLD AGE

Reading from left to right, three evolutionary ages of a brachiopod line, as traceable in the ornamentations of their shells.

ASTRONOMY

World's Largest Meteorite Discovered in Africa

THE WORLD'S largest meteorite yet discovered is reported found by a Johannesburg land surveyor in the Tanganyika region of Africa.

This record import from space consists of a mass of iron and nickel weighing some 70 to 80 tons and measuring nearly fourteen feet long. Its discoverer, W. H. Nott, staked a mining claim in order to obtain legal title to his discovery. The meteorite was found in open country about half way between Lake Nyasa and Lake Tanganyika.

The newly discovered meteorite, which undoubtedly fell to earth many years ago, will probably exceed in size the meteorite that was found in the northeastern part of Southwest Africa in 1928. This mass was then considered to be the largest actually discovered.

Both the new discovery and the 1928 meteorite are dwarfed by the immense meteorites that are believed to have caused the Meteor Crater of Arizona and the great earth scar in Yenissei province, Siberia. Neither of these has been recovered, but the Siberian fall was heard on June 30, 1908.

Science News Letter, March 7, 1931

NATIONAL PARKS

Isle Royale National Park Approved by Congress

ISLE ROYALE, a new national park in the East, lying right alongside the northern boundary of the United States where it passes through Lake Superior, was approved by the last Congress during the last few hours of its existence.

This island, the largest in Lake Superior, lies about 150 miles northeast of Duluth.

Isle Royale comprises about 205 square miles, of which some twelve square miles are taken up by 24 little lakes—lakes within a lake. To this there will probably be added a few more square miles in small adjacent islands.

The surface of the big island is extremely rough and picturesque. Great, irregular heaps of rock are covered with a mantle of moss and ancient trees. Fortunately for the proposed park, its ruggedness and remoteness have prevented the activities of lumbermen. The only damage ever suffered by the forests was from a naturally-caused fire many years ago, traces of which can still be found.

Nowhere else in the United States are so many moose to be found as here on this island. There are about two thousand of them. There are also about four hundred woodland caribou, which are the only specimens of this animal within the United States proper.

On Isle Royale also are some of the most interesting and most mysterious archaeological remains on this continent. There are old copper workings of unknown date, where Indians, or possibly the earliest white comers, mined copper nuggets.

Science News Letter, March 7, 1931

NATIONAL PARKS

Canyon De Chelly Now National Monument

See Front Cover

AFAMOUS canyon of the West, with ancient Indian ruins under the shelter of its thousand-foot red walls, has been given the status of a National Monument, by an act of Congress recently signed by the President.

This is the Canyon de Chelly in Arizona, with its tributaries, Canyon del Muerte and Monument Canyon. Although Canyon de Chelly is among the most noted of western canyons, relatively few people have seen it as yet, for the roads that lead to it are not good and there are only very limited accommodations. At present the principal object is to get the region under the protection of the National Park Service, which has administrative and police facilities for preventing vandals from looting the historically valuable ruins.

Before Congress could act on the proposal to make a National Monument of the area, consent had to be gained from the Navajo Indians, for it lies within their reservation. However, they make no use of the canyon itself, and only graze their livestock on the surrounding land, so that after due negotiations they were quite willing to agree to the change in status.

The area contains 131 square miles. The red sandstone walls of the canyons rise sheer above the river, to heights of 700 to 1,000 feet. In some cases the walls are absolutely perpendicular or even overhanging. They are much sculptured and brilliantly colored. In protected localities there are many cliff dwellings of unknown antiquity, reaching back to a period earlier than that recorded for any other southwestern ruins.

Science News Letter, March 7, 1931

IN SCIENCE

OCEANOGRAPHY

Expedition To Study Natural Ocean Laboratory

AYALE expedition, equipped to study the chemistry and physics of sea water more than a mile deep, is on the way to the Bahamas. Fitted with a special winch for reeling out 7,000 feet of airplane wire, carrying instruments to record conditions at that great depth, scientists on board the schooner "Abenaki" will concentrate their attention on a unique situation presented by two parallel deep troughs underlying the otherwise shallow seas around these islands off the coast of Florida.

The two narrow deeps which the expedition will study are known as Tongue of the Ocean and Exuma Sound. These submarine valleys run parallel to each other throughout most of their lengths, but open into the ocean depths at opposite ends very far apart. Biological collections dredged up by previous expeditions have been so unlike that it is believed the physical and chemical factors determining the conditions of life in the depths must be quite different. It is to get exact data on these conditions that the expedition has been organized.

Science News Letter, March 7, 1931

ARCHAEOLOGY

Unearth City of Dead On Aegean Island

DIGGING on the island of Lemnos in the Aegean Sea, the Italian Archaeological Institute has unearthed a necropolis which appears to be of considerable importance archaeologically.

The burials in this city of the dead are of a non-Greek race. The language, judging from the inscriptions, was surprisingly similar to the Etruscan. And most of the urns, weapons, objects of gold, and ceramic articles are so similar to Etruscan art that the possibility has been suggested that this people belonged to the race which later emigrated to Italian Etruria. Prof. A. Della Seta has been in charge of the excavations.

Science News Letter, March 7, 1931

CE FIELDS

PLANT PHYSIOLOGY

Manganese Not Needed By Green Plants

MANGANESE, strengthener of steels, lately believed to be equally important as a vivifier of green plants, may not be as universally necessary for vegetable life as has sometimes been assumed. Experiments performed at Iowa State College by Dr. Norman Ashwell Clark and Claude L. Fly apparently lend support to the doubters of the importance of manganese in the life of green plants.

In order to simplify their procedure, Dr. Clark and Mr. Fly used a floating water plant known as *Lemna*. They grew this in culture solutions both with and without manganese, and found that it would thrive in the total absence of that element. In concentrations of more than one part per million, manganese even exerted a poisonous effect.

The experiments are reported in full in *Plant Physiology*.

Science News Letter, March 7, 1931

BIOLOGY

Research Council Makes Fellowship Appointments

FELLOWSHIP appointments in the biological sciences for the academic year 1931-32 have been announced by the National Research Council, Washington. Seventeen new appointments have been made, and twelve students who held fellowships during 1930-31 have had them renewed.

The new appointees who will study in universities and research institutions in America are:

G. W. Adriance, Bryan, Texas; S. H. Bartley, Lawrence, Kans.; L. C. Craig, Carlisle, Iowa; S. T. Dexter, Ashland, Wis.; C. H. Graham, Worcester, Mass.; S. R. H. Hall, Moorefield, W. Va.; E. W. Hopkins, Randolph, Wis.; Burt P. Johnson, Madison, Wis.; S. L. Leonard, Arlington, N. J.; M. H. Lohman, Ann Arbor, Mich.; B. F. Skinner, Cambridge, Mass.; F. K. Sparrow, Jr., Washington, D. C.; R. G. Stone, Co-

lumbia, Mo., and F. P. Zscheile, Jr., Staunton, Va.

H. H. Jasper, Iowa City, Iowa; V. C. Twitty, Indianapolis, Ind.; and W. C. Young, Chicago, Ill., will study abroad.

Reappointments have been granted to the following fellows:

O. D. Anderson, Anderson, S. C.; L. W. Gellermann, Seattle, Wash.; E. H. Hinman, Ithaca, N. Y.; A. B. Keys, Berkeley, Calif.; R. K. Meyer, Madison, Wis.; E. R. Orent, Brooklyn, N. Y.; Daniel Raffel, Baltimore, Md.; H. M. Raup, Cambridge, Mass.; Gene Weltfish, New York, N. Y.; Samuel Yochelson, Buffalo, N. Y.; George Kreezer, New York, N. Y., and T. L. Steiger, Lincoln, Neb.

Science News Letter, March 7, 1931

GEOLOGY

Students Are Told How Coal Was Formed

THE STORY of coal has been presented to geological students at Yale University in a course of six lectures, by Dr. David White of the U. S. Geological Survey.

Dr. White is an advocate of the theory that coal was formed in place, by the steady fall of leaves and other plant detritus from long-standing forests in the vast, ill-drained swamps of the Pennsylvania geological period and other coal ages. The prevailing theory formerly was that coal was formed from plant remains washed into great shallow lakes. But by research in many mines Dr. White was able to show the widespread occurrence of the roots of the coal age trees, embedded in the clay strata underlying the coal.

Dr. White believes also that the laminated or sheet-like structure shown by almost all coals indicates a probable seasonal deposition. It is now well recognized that coal could have been, and probably was, formed in a temperate rather than a tropical climate. Whether the seasons were summer and winter, or merely recurring wet and dry periods does not matter much.

The occurrence of "mineral charcoal" on top of coal laminae does not necessarily indicate, in Dr. White's opinion, that the coal swamps were burned over at intervals. He thinks it more likely that these more highly carbonized layers in the coal were caused by the simple drying out of the swamps during the drier seasons of the year.

Science News Letter, March 7, 1931

PLANT PHYSIOLOGY

Lack of Potassium Makes Sugar Cane Sick

JUST AS men or animals will sicken if they do not get enough salt, so do plants become ill and stunted if they are starved of one or another of the mineral nutrients they need. Experiments performed at the University of Chicago by Dr. Constance Hartt of St. Lawrence University, of Canton, N. Y., show that sugar cane must have its modicum of potassium in order to remain healthy.

Deprived altogether of potassium, the cane plants suffered from decreased growth, dieback and deficient development of their all-important green coloring matter.

With a little potassium they showed a little growth; with more, better growth; there was a definite correlation between the amount of the mineral supplied and the amount of plant material produced. The only plant part that grew faster on a short potassium ration was the root system, and this growth was only in length, as though in search for the missing element; there was no increase in weight even in the roots.

There were internal abnormalities also in the cane plants on a potassium-starvation diet, expressing themselves both in unusual structural elements and in off-key physiological behavior.

For normal development the plants did not make excessive demands. All they needed, so far as the potassium ration went, was 39 parts of it in ten million parts of the solution supplied to their roots.

Science News Letter, March 7, 1931

ORNITHOLOGY

Bird's Nest Found In Skin of Hare

A GERMAN hunter reports a find that almost matches the Biblical story of Sampson discovering a colony of bees in the carcass of a lion. In the dried-up remains of a hare wedged in the branches of a fir tree he found the nest of a bird containing a full complement of eggs. The hare had probably been picked up dead by an earlier hunter, hung up in the tree and then forgotten.

What should have prompted the bird to select this utterly unusual and somewhat gruesome nesting site is a puzzle to naturalists.

Science News Letter, March 7, 1931

INVENTION

Vulcanization of Rubber

"A Classic Invention"

The Inventor, Charles Goodyear, Tells How He Made
"Gum-Elastic" Into a Material of Thousands of Uses

GUM-ELASTIC and its varieties, with a detailed account of its applications and uses, and of the Discovery of Vulcanization. By Charles Goodyear. New Haven: Published for the Author. 1853. (A few copies of this book, designed for public libraries, were printed on thin sheets of rubber, and bound in a beautiful, heavily carved binding of the same substance. The U. S. National Museum collection of Goodyeariana contains a copy of this edition. But the inventor in this case was over-enthusiastic for his material, and except in one or two places the pages are hopelessly stuck together.)

1834

THE INVENTOR commenced his experiments in a small dwelling, mixing the gum by hand, and spreading it upon a marble slab with a rolling-pin. He here also commenced the art of embossing on glazed cambrics. It was now supposed by himself as well as others, that his success in the treatment of gum-elastic warranted his attempts to manufacture the goods.

By the disinterested and timely aid which was gratuitously offered him by a gentleman of New Haven (Ralph B. Steele, Esq.), he was enabled to commence the manufacture on a small scale, pulling and kneading the gum by hand, and spreading it with an iron pin upon a marble slab, as above stated. With the aid of a few hands, he succeeded, among other things, in the manufacture of a few hundred pairs of shoes from the embossed goods, which would even now be considered beautiful.

Being impressed with the idea that the difficulties which were met with in the manufacture of the gum, were attributable to the solvents which were used, he considered himself fortunate at this time to find in the market some forty or fifty barrels of India rubber sap, among which were a number of casks in which the gum had not coagulated. It was said to be kept in that state by mixing a portion of alcohol

with it, before it was exported from Para. The inventor now hoped to surmount all difficulties by using the sap in this liquid state, if he failed to succeed with other experiments.

A son of Erin, who had been employed to work at the gum, had imbibed the same idea from his employer, and was beforehand in putting it in practice. On the arrival of the barrels containing the sap, he opened one at night, and on meeting his employer at the shop in the morning, Jerry good humoredly signified to him that he had supplanted him, and that a Yankee was not so quick at inventing as an Irishman, at the same time pointing to the trousers he had on, which he had dipped in the barrel of sap. The job was so completely done, that at first the impression was produced that the improvements were completed, and that experiments with gum-elastic were nearly at an end. Jerry sat down to his labor of mixing gum before the fire, as usual, and on attempting to get up again a few minutes after, he found that he was not only cemented to his seat, but that his legs were cemented together. On being extricated from his improved trousers, to the no small merriment of the bystanders, he subsequently manifested no further inclination for invention.

This experiment was a convincing proof that adhesiveness was a property which belonged to the gum, and was not the consequence of imperfect manufacture.

1838

In the summer of 1838 [the inventor] became acquainted with Mr. Nathaniel Hayward, of Woburn, Mass., who had been employed as the foreman of the Eagle Company at Woburn, where he had made use of sulphur by impregnating the solvent with it. It was through him that the writer received the first knowledge of the use of sulphur as a drier of gum-elastic. Mr. Hayward was left in possession of the factory, which was abandoned by the Eagle Company.



DIAMONDS SET IN RUBBER

Goodyear tried using rubber for almost every imaginable purpose, although he doubted that "a material can be adopted for ornaments which is not 'dear bought and far fetched.'" This beautiful watch and necklace are part of a collection exhibited by Goodyear in Paris, and now in possession of the U. S. National Museum.

Soon after this it was occupied by the writer, who employed him for the purpose of manufacturing life-preservers and other articles, by the acid gas and solarizing processes. About this time the writer purchased the claim of combining sulphur with India rubber, of Mr. Hayward, for which a patent was taken out February 24, 1839. It should be remarked that this claim was for the use of sulphur, and not for the heating or vulcanizing process, subsequently discovered by the writer.

1839

At this time, as well as on many former occasions, if the improvement sought for had been one connected with machinery, or one, the prosecution of which depended upon the art of any human being, or upon any amount of capital beyond a few six pences at a

time, necessity would have compelled him to yield; but so long as these could be obtained or hoped for, experiment could be continued, and the discovery made, at it was, in the most humble sphere.

The inventor now applied himself alone, with unabated ardor and diligence, to detect the cause of his misfortune, and, if possible, to retrieve the lost reputation of his invention; and, as had happened on former occasions, he had hardly time enough to realize the extent of his embarrassment, before he became intently engaged with another experiment, and his mind buoyant with new hopes and expectations; which, as it afterwards proved, were to be, for this time at least, more than realized.

While on one of the visits above alluded to, at the factory at Woburn, and at the dwelling where he stopped whenever he visited the manufactory at Woburn, the inventor made some experiments to ascertain the effect of heat upon the same compound that had decomposed in the mail-bags and other articles. He was surprised to find that the specimen, being carelessly brought in contact with a hot stove, charred like leather. He endeavored to call the attention of his brother, as well as some other individuals who were present, and who were acquainted with the manufacture of gum-elastic, to this effect, as remarkable, and unlike any before known, since gum-elastic always melted when exposed to a high degree of heat. The occurrence did not at the time appear to them to be worthy of notice; it was considered as one of the frequent appeals that he was in the habit of making, in behalf of some new experiment.

He however directly inferred that if the process of charring would be stopped at the right point, it might divest the gum of its native adhesiveness throughout, which would make it better than the native gum. Upon further trial with heat, he was further convinced of the correctness of this infer-

ence by finding that India rubber could not be melted in boiling sulphur at any heat ever so great, but always charred.

He made another trial of heating a similar fabric, before an open fire. The same effect, that of charring the gum, followed; but there were further and very satisfactory indications of ultimate success, in producing the desired result, as upon the edge of the charred portions of the fabric, there appeared a line, or border, that was not charred, but perfectly cured.

He now removed with his family to Lynn, in order that he might have access to the steam power of Messrs. Baldwin & Haskins, for the purpose of trying experiments in vulcanizing by steam.

A few weeks after, he removed from Lynn to Woburn, where he now pursued his inquiries and experiments for some months quite alone, until the desired result was obtained. On ascertaining to a certainty that he had found the object of his search, and much more, and that the new substance was proof against cold, and the solvents of native gum, he felt himself amply repaid for the past, and quite indifferent as to the trials of the future.

Nature of the Discovery

The change wrought in the native gum by this process may with propriety be compared to that which is wrought in a perishable skin or hide, by the process of tanning, which converts it into a beautiful kid, or substantial leather; or to that by which the crude ore is changed, by the process of smelting, into valuable iron for man's use; or to that by which iron is changed by the well known process of baking with carbon, into steel. This latter comparison holds good, not only as to the results, but also as to the method, except that instead of carbon, sulphur is used in the baking process, treated of for vulcanizing the gum, which is penetrated by sulphur after it has taken the form of a gas, a high degree of heat being used in both cases. One remarkable fact is exhibited by this improvement, which is an apparent anomaly in chemistry. An article is obtained which is not dissolved without great difficulty, by the best known solvents of gum-elastic, which yet possesses all the valuable properties of the native gum, and many others that the native gum does not possess. It will be readily perceived, that the effect of this process is not simply the improvement of a substance; but it amounts, in fact, to the production of a new material. The dur-



CHARLES GOODYEAR

The man "who has on an India rubber cap, stock, coat, vest, and shoes, without a cent of money in it," according to the testimony of one of his friends. This portrait of the inventor, painted on a panel of hard rubber, is in the U. S. National Museum.

ability imparted to gum-elastic by the heating or vulcanizing process, not only improves it for its own peculiar and legitimate uses, but also renders it a fit substitute for a variety of other substances where its use had not before been contemplated. It may, at first thought, appear absurd to compare the durability of an article like gum-elastic, with that of metal or wood, yet it will be found upon investigation, that in consequence of its resistance of corrosion and decay, it is, for certain purposes, far more durable than either of these, as has been found by actual trial. . . . It has now been proved, by several years' experience in its use, that by this discovery, a substance is produced, possessing all the valuable properties of gum-elastic in the highest degree of perfection, without the imperfections pertaining to the native gum, which must have prevented gum-elastic ever being applied to many purposes of great utility, for which, by the removal of its objectionable qualities, it is now made available.

When a new material is in any way made available to the arts and manufactures, it is impossible to set bounds to its application, or to the extent of the benefits to be derived from it.

Science News Letter, March 7, 1931

ALUMINUM

A Scientific Curiosity

BORON

The Metal from Borax

Are the Subjects of

NEXT WEEK'S CLASSIC OF SCIENCE

Health Levels of Evolution

From Page 151
and at the same time by the inability of the animals to recover from injury and repair breakages as quickly and completely as their ancestors in the palmier days of the species. After that, extinction.

Dr. Fenton states that in all his series he has found only indications of a straight-through, determinate course of evolution. There is no indication that the effects were brought about by changes in environment, and there is no sign of the operation of natural selection considered by Darwin to be necessary in bringing about evolutionary changes.

Science News Letter, February 14, 1931

Manganese was much in demand in the days of Egyptian civilization.

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ASTRONOMY

Many Sunspots Reported By Mt. Wilson Astronomers

SUNSPOTS decorate the sun in large numbers, reports to Science Service from the Mt. Wilson Observatory, Pasadena, Calif., reveal.

Thursday, Feb. 26, there were 32 spots arranged in seven groups, while the day before there were 40 spots in six groups.

Visitors to the National Academy of Sciences building in Washington were able to see many small spots spread over the image of the sun as projected within the rotunda of that building.

On the first day of February the sun was entirely free from disturbances although usually during the past few months there have been a few spots reported by the Mt. Wilson Observatory.

The sun rotates on an axis from west to east just like the earth. The gigantic and complex disturbances in the outer

layers of the sun which cause the spots therefore seem to pass across the face of the sun, sometimes reappearing some 13 days later after having travelled around on the other side.

Sunspots occur in cycles with a maximum number appearing every eleven years or so. As the last maximum occurred in 1928 or 1929, it is now about half way between a maximum and minimum. By 1934 the sun's activity should be quiescent.

The effect of sunspots upon the earth has been one of the most active questions in astronomy for many years. There seems to be good evidence that spots, or the solar conditions causing them, in some way affect radio reception, magnetic disturbances, and that sometimes they put telegraphic lines out of commission by setting up earth currents.

Some spots are very large and visible to the unaided eye when the sun is viewed through heavily smoked glass. Others are very small, the smallest detectable being about 300 miles across. Some of the largest have measured 60,000 miles across. They may last for several months or they may disappear in a few hours.

Science News Letter, March 7, 1931

ASTRONOMY

Astronomy Medal Awarded To Universe Maker

ONE of the universe makers of today, Dr. Willem de Sitter, director of the Observatory at Leiden, Holland, has been awarded the 1931 Catherine Wolfe Bruce Gold Medal of the Astronomical Society of the Pacific.

This honor is conferred for "distinguished services to astronomy." Dr. de Sitter's concept of the universe has received wide discussion among astronomers and philosophers. He conceives that space would have curvature even if it were totally devoid of matter, whereas Prof. Einstein's original theory of relativity supposed the presence of matter to be the only cause of the bending of space.

Science News Letter, March 7, 1931

PUBLIC HEALTH

Congress Provides for Fight On Spread of Spotted Fever

As Disease Extends Boundaries in West, Health Service Workers Announce Discovery of Similar Malady in East

CONGRESS has passed the Walsh bill to take over the Hamilton, Montana, Rocky Mountain spotted fever laboratories at a cost of \$75,000 and in the Second Deficiency Bill as it came up for final passage there was a second \$75,000 item for the purpose of constructing another governmental laboratory on this site. The Rocky Mountain spotted fever work has become so important to the whole country as a result of its recent spread eastward, that a special drive by the National Institute of health will be necessary in combatting the disease in 1931-32.

As Congress provides the means to fight the dangerous Rocky Mountain spotted fever, which it had been thought was confined to the west, three research workers of the U. S. Public Health Service in Washington—Drs. R. E. Dyer, L. F. Badger and A. S. Rumreich—report evidence that the fever, or a disease very like it, occurs in the states of the eastern seaboard.

Rocky Mountain spotted fever is caused by a virus which gets into the blood by the bite of a tick. The first symptoms are chills and general discomfort. The fever may run as high as 107 degrees Fahrenheit. On or after the fourth day an eruption or spotty rash appears which is dark red and may become purplish. Pains in the bones, muscles, head and neck, and delirium are other symptoms. The disease lasts for several weeks. In some localities it is highly fatal. A protective serum has been developed by Dr. R. R. Spencer of the Public Health Service.

In April, 1930, Dr. Dyer and colleagues began investigating cases of typhus fever which had been reported in some numbers from southeastern states. They soon found that there were actually two diseases, one typhus and one a similar disease which they believe is Rocky Mountain spotted fever. At least the second disease cannot be distinguished from Rocky Mountain spotted fever clinically.

They found that patients who had typhus lived in cities or towns, while

the spotted fever patients with only one exception lived in the country. Most of the typhus patients had been in close association with rats and many remembered being bitten by fleas, probable typhus carriers, shortly before they became ill. Half of the spotted fever group had been bitten by ticks and the rest had lived under conditions in which tick bite was possible. The spotted fever cases, moreover, occurred at times which corresponded with the tick season, whereas the typhus cases were scattered throughout the year. No deaths occurred in the typhus group but in the Rocky Mountain spotted fever group there were seven.

Dr. Dyer and his colleagues followed up the circumstantial evidence they had gathered in their field investigations. From blood of some of the spotted fever patients a virus was established which resembles closely the virus of Rocky Mountain spotted fever.

One of the most conclusive bits of evidence was the immunity test. Animals and men that have had spotted fever once do not get it again, but are

immune to it. The investigators found that animals that had recovered from Rocky Mountain spotted fever were immune to the strain isolated from the unknown disease of the Southeast. Conversely, animals recovered from the unknown disease were immune to Rocky Mountain spotted fever.

Proof that this new disease in the Southeast is Rocky Mountain spotted fever seems positive, but the U. S. Public Health Service's cautious scientists refrain from saying so yet, and call the new disease "an infection of the Rocky Mountain spotted fever type."

In the East, the Rocky Mountain spotted fever type cases occurred or originated in rural communities in Delaware, Maryland, Pennsylvania, Virginia, North Carolina and the District of Columbia.

Science News Letter, March 7, 1931

RADIO

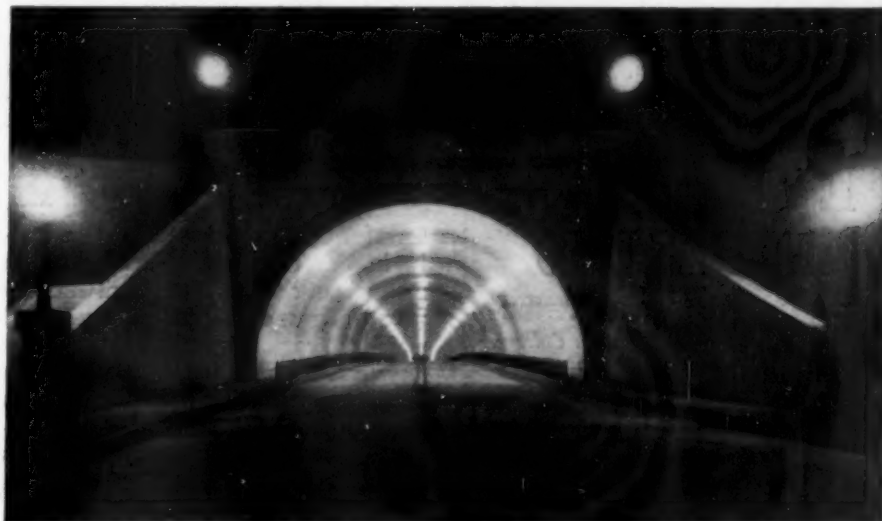
Government To Build New Radio Laboratories

TWO HUNDRED acres of land near Washington will soon be purchased by the Bureau of Standards of the U. S. Department of Commerce as a new site for radio research activities.

A bill authorizing such a purchase was passed by Congress.

Experiments both in sending and receiving will be made. A number of buildings and an experimental radio transmitting station will be constructed.

Science News Letter, March 7, 1931



HIGHWAY THROUGH A MOUNTAIN

The camera has caught in an excellent mood the new and well lighted Beaucatcher tunnel at Asheville, N. C., so named for the mountain through which it passes. It is 1,035 feet long, 40 feet wide and 22 feet high, and eliminated a tortuous road over Beaucatcher mountain bringing national and state highways to the city. The construction cost was \$423,000.

LYNDE'S EVERYDAY PHYSICS reduces class failures because it makes the subject intelligible and interesting to all—even those students with least aptitude to the subject.

The illustration examples and applications are taken chiefly from the home and the agencies that serve the home. Each type of household appliance is discussed in a complete chapter, and each chapter on a particular type of appliance precedes a chapter on the principles applied.

Solved problems are used freely to help the student clarify his knowledge and make it precise, and an abundance of unsolved problems encourage him to depend on himself for constructive progress.

The common system of weights and measures is used in addition to the metric system. Discussion of the difficult part of mechanics is postponed to the end of the book when the student has gained the power of dealing with it.

EVERYDAY PHYSICS

By **CARLTON JOHN LYNDE**
Professor of Physics, Teachers College,
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PUBLIC HEALTH

Glands, Vitamins, Microbes Conspire for Child Health

GLANDS, vitamins and bacteria, and their role in the life of a healthy child were discussed at the medical section of the White House Conference on Child Health and Protection, during its final session at Washington, D. C.

Three months after the other experts of the Conference had made their reports, the doctors, nurses, psychologists and psychiatrists reported to President Herbert Hoover just how healthy American children are now, and how they can be made even healthier and happier in the future.

Before the child reaches the stage of codliver oil and sunbaths, of diphtheria toxin-antitoxin, or of possible thyroid gland disturbance, the glands, vitamins and bacteria have begun playing their part in making him healthy and strong or weak and susceptible to disease, the experts reported.

The female sex hormones and the pituitary gland have been the subject of much recent investigation. The facts on these vital subjects have accumulated so rapidly that medical opinion has not been able to evaluate them thoroughly and decide just what they mean.

"Additional experimentation and critical analysis of work already completed are urgently needed to clarify the general situation," reported the committee which considered this phase of the situation. Chairman of the committee was Dr. Leslie B. Arey, professor of anatomy at Northwestern University Medical School.

Microbes are not all harmful, the committee pointed out. Some of the non-harmful group are those found normally in the intestines. These establish themselves shortly after birth and by fermenting sugars, produce lactic acid which the committee called nature's preservative. This acid restrains the growth of disease-producing bacteria and adds much to the defense of the infant's vulnerable digestive tract. Along with this protection against intestinal infection goes resistance to respiratory infections, such as cold, bronchitis and pneumonia.

Vitamins begin playing their role of protection before the child is born. The vitamin content of the mother's diet has its effect both on mother and on child.

Vitamins A, C, D and E are the ones particularly mentioned by the committee because of their importance to the mother's health and the child's development and future well-being.

Being a father or a mother should be the most important job in the world. And it will be if the experts in psychology and psychiatry get their way.

"The parent is far from being overlooked in the plan," stated Dr. Bronson Crothers, assistant professor of pediatrics at Harvard University Medical School. "He is not to be allowed to shift his responsibilities to the shoulders of the psychiatrist or even of the family doctor."

"If our committee's plan materializes, bringing up the child will consist of much more than feeding him, sending him to school, and calling in the doctor to set a broken bone or remove the tonsils; it will be, as it should be, the most important profession in the world."

Science News Letter, March 7, 1931

PHYSICS

Standards Established For Sunburn

SUNBURNS produced by artificial sun-light mixtures have now been measured by comparing the tint produced with different strengths of dye solution.

The object of this work reported to the American Physical Society by Dr. E. Q. Adams of the General Electric Company was not to establish a becoming shade for debutantes but for the protection of those who are taking ultraviolet treatments as a health measure.

The burn does not reach its maximum redness at the end of the exposure to the mercury arc light, said Dr. Adams, but continues to increase to a maximum after the rays are cut off. The behavior is very similar to the production of the black image during the development of a photographic plate.

Dr. Adams has investigated the burns produced when ultraviolet lights of different wave lengths are applied together.

Science News Letter, March 7, 1931

ORNITHOLOGY

Nature Ramblings

By FRANK THONE



Horned Larks

EARLY spring is now well in possession of pastures and fallow lands, and here the wayfarer may find the horned larks. If he walks quietly he will hear their songs—thin, reedy, sweet little pipings; not the full-throated warblings of their later-coming and larger brethren, but all the pleasanter now for being heard in a desert season.

The "horns" that give the little lark its name are really tufts of feathers, one above each ear. They are so small that normally one cannot see them with the naked eye at ranges within which the bird will permit one to approach. But a pair of opera glasses or a low-power field glass will make them easily visible. Such an optical aid will also make it possible to study the interesting black markings on brow, cheek and throat. The ground-hue of the head, aside from these black markings, is either white or yellow; the rest of the bird's body is "sparrow-colored." Both male and female have the "horns" and the head markings; immature young lack them and look a good deal like sparrows.

In some regions the horned larks hardly stay the winter through. Where the severity of the storms does drive them out they do not go far. They are not afraid of snow and cold, and can pick up a thrifty living on weed seeds and wild fruits. They are strictly ground dwellers, even perching on the bare earth at night when they sleep. This keeps them down where they can do the most good as destroyers of next year's potential weed crop.

Science News Letter, March 7, 1931

One explanation for the recent decrease in airplane production is that the life of commercial aircraft is longer than was expected a few years ago.

METEOROLOGY

February Rains Bring Temporary Drought Relief

FEBRUARY rains have relieved but not ended the unprecedented drought conditions which have prevailed over wide areas of the United States as a result of the unusual deficiency in rainfall during 1930 and January, 1931.

Reports to the United States Weather Bureau for the first 25 days of February reveal that despite the substantial heavy rains falling early in the month over large sections of the persistently dry areas of the country, there is still a moisture deficiency in many regions.

In the Ohio Valley states, the rainfall for the 25-day period was 70 to 90 per cent. of normal. The Middle Atlantic and Southern Atlantic States had less than half their normal quota of rain during this same period, while the upper Mississippi region had less than one-fourth the average precipitation for this period.

Normal to more than twice normal rainfall was enjoyed by Tennessee, southern Missouri, Arkansas, Oklahoma and Texas, however. Indeed, recent rains have made Arkansas and the eastern half of Texas too wet in the first week of March.

"Moderate rains in the Ohio Valley and Middle Atlantic area have improved the top soil in these sections but the subsoil is yet unsupplied," reports J.

B. Kincer, chief of the division of agricultural meteorology of the U. S. Weather Bureau.

"Recent rains in the South Atlantic states and West Virginia have put the top-soil in a good condition but the sub-soil is in need of moisture, while the upper Mississippi region needs rain."

The continuation of mild, open weather and light moderate rains over large areas recently has been unusually favorable for outside work on farms but where the depleted subsoil supplies of water have not been replenished, the drought hazard is not ended, though the immediate situation is relieved.

Science News Letter, March 7, 1931

March's Thesaurus Dictionary

Finds the word you have forgotten, and defines it. See full description in full page advertisement, issue of November 8, 1930.

Write for "Three Men and a Book," an entertaining little booklet showing the advantage of March.

Historical Publishing Co.
Dept. SCX, 1334 Cherry St., Phila., Pa.

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• First Glances at New Books

Anthropology

MAN FROM THE FARTHEST PAST—Charles Whiting Bishop, with the collaboration of Charles Greeley Abbot and Ales Hrdlička—*Smithsonian Institution Series, Inc.*, 375 p. This volume constitutes a very worthy addition to the Smithsonian Institution Series, which is rapidly growing into a most significant monument in American scientific publishing. With an encyclopedic sweep, it covers the whole of man's past evolution and his present deployment. The task has been well divided, Dr. Abbot describing the cosmic stage on which man finds himself, Dr. Hrdlička summing up the acts that have passed, and Mr. Bishop describing, with excellent selectivity, the highlights of the multitudinous developments of the present.

Science News Letter, March 7, 1931

General Science

WATER AND AIR—Morris Meister—*Charles Scribner's Sons*, 238 p., \$1.08. A text of general science for the elementary and junior high school. The content has been very carefully selected on grounds of teachability, interest, adaptability to the ability and experience of seventh and eighth grade children and future value in adulthood. The chemistry and physics of water and air are attractively presented in reference to their functional significance in life in accord with the newer educational philosophy.

Science News Letter, March 7, 1931

Medicine

FADS, FRAUDS AND PHYSICIANS—T. Swann Harding—*Lincoln MacVeagh*, 409 p., \$3.50. The author seems to have a grudge against physicians and modern medical practice which he vents in this book.

Science News Letter, March 7, 1931

Genetics

HEREDITY—F. A. E. Crew—*Cape and Smith*, 119 p., 60c. A very compact and well-presented summary of the principal facts and generalizations of modern genetics.

Science News Letter, March 7, 1931

Anatomy

WARREN'S HANDBOOK OF ANATOMY—Robert M. Green—*Harvard University Press*, 384 p., \$12.50. Prepared from original dissections made by Dr. John Warren, late associate professor of anatomy, Harvard Medical School.

Illustrated by 324 drawings made by H. F. Aitken under Dr. Warren's observation for this book which he had planned but not completed before his death. The volume is intended as an atlas or handbook for dissection and a reference volume for surgeon and general practitioner.

Science News Letter, March 7, 1931

Psychology

EMOTIONS OF MEN—Frederick H. Lund—*McGraw-Hill*, 348 p., \$2.50. A readable book intended for the layman discussing how emotions are aroused, and the effect they have on human lives.

Science News Letter, March 7, 1931

Medicine-Hygiene

TUBERCULOSIS, ITS CAUSE, PREVENTION AND CARE—Frank H. Livingston—*Macmillan*, 191 p., \$2.50. Written by a layman who has had tuberculosis. The book is not without inaccuracies, particularly in the technical part, but the author has learned and gives correctly the important lesson for the tuberculous of resting and following the advice of a competent physician. Helpful advice about the practical details of life for the tuberculous is also given.

Science News Letter, March 7, 1931

General Science

1931 ANNUALOG—Edited by Louis S. Treadwell—*Scientific American Publishing Co.*, 263 p., \$1.50. This compilation of scientific miscellani, much of it reprinted from various sources, is now in its sixth edition.

Science News Letter, March 7, 1931

Mathematics

PROBABILITES ET STATISTIQUES—R. de M de Ballore—*Hermann et Cie, Paris*, 211 p., \$2.40. A thorough but not too lengthy exposition, from a unified viewpoint, of the mathematical theory of probability as applied in statistics. Invaluable for scientific workers interested in reliable statistical method.

Science News Letter, March 7, 1931

Botany

PLANTS OF THE GOLD COAST—F. R. Irvine—*Oxford Press*, lxxix + 519 p., \$1.75. Botanists interested in African plants, or in tropical plants generally, will welcome this addition to the literature, gathering up, as it does, information hitherto largely inaccessible scattered or not in printed form at all.

Science News Letter, March 7, 1931

Physics

THE QUANTUM THEORY—Fritz Reiche—*Dutton*, 218 p., \$2.10. Reiche's brilliant little book has been a leading agency in spreading the fundamentals of the quantum theory to university readers with a limited amount of time. Despite the breath-taking advances since the first edition in 1922 one must still approach the subject by the old avenues. The present issue contains a short summary of the new developments.

Science News Letter, March 7, 1931

Psychology-Ethnology

RACE PSYCHOLOGY—Thomas Russell Garth—*McGraw-Hill*, 260 p., \$2.50. The author, who is an experimental psychologist, attempted to find the mental differences between the various races of mankind. He was astonished to discover that they are conspicuously absent. Written for the layman as well as the scientist.

Science News Letter, March 7, 1931

Chemistry

PHOTOCHEMISTRY—D. W. G. Style—*Methuen*, 96 p., 2s 6d. The Methuen Monographs should prove valuable to teachers and research workers in a given field who cannot digest the more comprehensive texts in other branches of the same field. The present volume will be read with interest by physical and biochemists.

Science News Letter, March 7, 1931

Psychology-Education

THE DEVELOPMENT OF CHARACTER TRAITS IN YOUNG CHILDREN—Amelia McLester—*Scribner's*, 126 p., \$1.25. Contains definite suggestions for character instruction in schools. One of the Series on Childhood Education edited by Patty Smith Hill.

Science News Letter, March 7, 1931

Metallurgy

SHEET STEEL AND TIN PLATE—R. W. Shannon—*Chemical Catalogue Co.*, 285 p., \$5. An interesting description of the making, rolling, treating and finishing of iron and steel products with special reference to the sheet steel and tin plate industries. The book is written for the layman whose occupation or interest is connected with some iron product or who wishes to get a glimpse of the fascinating technical manipulation of this pivotal material. Yet it will be equally valuable to the expert.

Science News Letter, March 7, 1931